

Sandhill Crane: Thermal Imagery Workflow

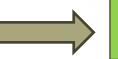
Imagery collection & conversion: Convert images to 8-bit jpg^a, extract metadata & shapefile^b

^aWith tool provided by Quantaero ^bGithub script #1 (R)



Remove images outside survey^c & removal of land-only images^d

^cClip shapefile with survey polygon (ArcPro) ^dGithub script #2, #3 (Python)



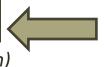
Apply 2-SD contrast stretch^e

^eGithub script #4 (Python)



Apply inference on YOLO modelⁱ

Github script #8 (Python)



Split train/test data^g; Train & test YOLO model^h

^gGithub script #6 (R) ^hGithub script #7 (Python)



Annotation path: Create tiles from parent images^f

fGithub script #5 (Python)



Convert inference csv to Label-Studio json; import preliminary annotations into Label-Studio; export annotations in YOLO format^j



After final model iteration, follow the Survey Count path (next slide)

All scripts provided in Github:

https://github.com/USFWS/AI-for-USFWS-Migratory-Birds/tree/main/Sandhill%20crane

^jGithub script #9 (Python)

Migratory Bird Program - Conserving America's Birds



Sandhill Crane: Survey Count Workflow

Run YOLO detection model inference on individual images^k

^kGithub script #8 (Python)



san pre

For images with > 5 sandhill cranes predicted, orthorectify/ mosaic images¹



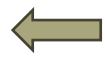
Run YOLO detection model inference on mosaics^m

^mGithub script #8 (Python)

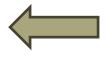
PosPAC Post-processing of POS data, then Github script #10 (Linux)



Determine final counts



Calculate near distances; remove all predicted birds > 50 m from nearest neighbor; manually review mosaics & remove extraneous data (i.e., predictions on land)°



Plot spatial locations of sandhill cranes, ducks/geeseⁿ

ⁿGithub script #11 (Python)

°Conducted in ArcPro